REMARKS

Applicants respond as follows to the June 18, 2003 Office action. Reconsideration is respectfully requested.

Claims 1-18 are pending in this application. New claims 6-18 are added.

The Examiner has rejected claims 1-4 under 35 U.S.C. 102(b) alleging they are anticipated by U.S. Patent 5,894,124 to Iwabuchi et al.

Applicants respectfully traverse. Amended claim 1 recites "power supply means (28) for adjusting a potential difference between the specimen (18) to be irradiated by means of the apparatus and the final electrode the power supply means electrically connected between the specimen holder and the electrostatic final electrode." Applicants' potential difference, as disclosed and claimed, is provided longitudinally along the axis of an SEM. In addition applicants' potential difference as claimed is provided by a direct electrical connection between the specimen holder and a final electrode.

In contrast, the majority of Iwabuchi's disclosure is drawn to a potential difference provided transverse to the axis of an SEM. Iwabuchi (124) discloses providing a potential difference between two electrodes 19 and 20 (FIG 2) of a deflecting device 17 (FIG 1). The reference, as stated by the examiner, discloses a "voltage applied to the deflecting electrode device is controlled in accordance with the tilting of the sample stage". Iwabuchi (124) illustrates (FIGs 1,7,8,9,10,and 11) the controlled linkage of amount of sample tilt to the potential difference of the deflecting device electrode with a single line connecting the sample stage 10 to the deflecting device 17 with a control unit 18 therebetween. There is no direct electrical connection between the specimen and an electrode arranged directly ahead of the specimen holder suggested by Iwaguchi. Just a transverse potential adjusted according to the tilt of the specimen. Iwabuchi suggests to control the voltage of the specimen holder with the voltage control unit 23 shown in Figs 8,9,10, and 11. However, it does not suggest a direct electrical connection, or a means to make a direct adjustment as disclosed and claimed by applicants.

Iwaguchi also seeks to solve a very specific, and different, problem than applicants do. As stated by Iwabuchi (124) in col. 1, lines 30-33 "when a conductive sample is tilted, an axisymmetric property of an electric field between a sample and an objective lens is put into

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disorder, and consequently a lateral electric field component is generated". Applicants provide a particle-optical apparatus in which requirements of high collection efficiency and suitable voltage contrast can both be satisfied. Iwabuchi has clearly not anticipated solving the same problem applicants have, and the structure described by Iwabuchi does not anticipate applicant's invention as claimed in claim 1 or claims 2-4 which depend therefrom.

The examiner has rejected claims 1-5 under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent 5,894,124 to Iwabuchi et al in view of Sato U.S. Patent 5,149,968.

Applicants disclose and claim an SEM in which the potential difference between the sample and the final electrode can be controlled and adjusted. By adjusting the voltage between the specimen and the final electrode each observation can be optimized according to observation parameters. The apparatus, according to the invention, can satisfy both high collection efficiency and suitable voltage contrast requirements, and is useful for integrated circuit inspection and for observing ion beam implantation in integrated circuits.

The subject of Iwabuchi's disclosure deals with the relationship between the specimen tilt angle and providing a lateral voltage to compensate for the non-axisymmetric field caused by the tilt. The subject of Sato is the relationship between a predetermined reference value acceleration voltage and providing a cylindrical shield or not providing one. Even if one skilled in the art were motivated to look to combine these two references applicant's invention would not result.

Iwabuchi teaches repairing resolution when faced with astigmatism, and detection efficiency. xxx Sato teaches observation over a wide visual field during observation at high voltage and high resolution with little axial error during observation at low acceleration voltage (col. 2 lines 24-30).

The examiner makes specific reference to Sato (968) when rejecting claim 5. The examiner states:

> "Iwabuchi (124) disclosed nearly all the limitations of claims 1-5 above but did not disclose an 'electrode being situated completely to one side of the optical axis' as recited in claim 5. Sato (968) however discloses... when the acceleration voltage 50 is above the reference voltage 51, the shield electrode 11 is moved to the position in FIG 2B,...".

FIG 2B shows the shield electrode to one side of the optical axis. One skilled in the art would learn from Sato (968) to position a tubular shield electrode in an operative state, as shown in FIG 2A, being coaxial with the optical axis in order to protect a low acceleration voltage primary

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electron beam from the secondary electron leading out field. However, FIG 2B illustrates a non-operative state according to Sato's disclosure and doesn't teach more than a state of not shielding. Sato's disclosure teaches (see abstract) "a shield electrode is disposed for shielding an electric field on an optical axis in order to prevent a primary electron beam from being bent by the electric field generated by a secondary electron detector". Referring now to Sato col. 4, lines 3-6 "the shield 11 is moved to the end portion inside the optical column so that the shield electrode 11 does not affect the secondary electron leading out field". It's clear from Sato the non-operative position of the shield is within the optical column in FIG 2B only to avoid an otherwise complete removal from the column, to simplify Sato's design, and "so the interior of the optical column is kept in vacuum" (col. 3 lines 48-49). One skilled in the art looking to Sato's disclosure would interpret FIG 2B as an optical column with no shielding of the leading out secondary electron field. Indeed Fig 2B illustrates a cylinder off to the side of the optical axis put there to do nothing and serve no purpose except to get out of the way. On the other hand applicants' recitation of said final electrode (40) being situated completely to one side of the optical axis (4)" claims an element which serves a real purpose as supported by applicants' disclosure.

The arrangements disclosed by Iwabuchi and Sato when considered separately or combined are different from applicants, and the problems sought to be solved are different. The parameters considered to affect SEM performance discussed and adjusted are also different. Accordingly applicants respectfully request the examiner reconsider the rejections and allow all the claims in the case.

Only applicants teach an arrangement to realize both high collection efficiency and suitable voltage contrast by means of a single adjustment made possible by the direct electrical connection between the specimen holder and a final electrode. And only applicants teach and claim how, by "adjusting a potential difference between the specimen to be irradiated by means of the apparatus and the final electrode" (claim 1).

Claims 2-5 depend from claim 1 and include all the limitations thereof which applicants regard as being in condition for allowance. Further applicants have provided discussion specific to the differences between the references cited and claim 5. Allowance is respectfully solicited.

The applicants have submitted new claims 6-18 which are believed to avoid the prior art. Claims 7-13 are method claims. As described above, Iwabuchi teaches a method for

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compensating for a tilted stage, and not the claimed methods. Even if the structure of Iwabuchi were identical, which it is not, Iwabuchi does not teach or suggest operating a structure in accordance with the claimed method.

In particular independent claim 8 recites a method including "varying the potential difference between the specimen to be irradiated by means of the apparatus and the final electrode such that the collection efficiency for an area of observation by the apparatus is reduced to 25-75% of the maximum obtainable collection efficiency, said varying the potential differences maximizes the voltage contrast". This is graphically illustrated by applicants' Figs 3a and 3b. The last two paragraph of claim 9 recite similar subject matter only made possible by applicant arrangement. Iwabuchi et al. teaches a number of additional detectors placed along the optical axis as depicted by 26 in Figs. 9 & 11 and 17 in Fig 7 to synthesize separate signals. Column 9 lines 34-35 state, "it is possible to obtain the optimum contrast corresponding to a sample." However, Iwabuchi makes no suggestion, and teaches no apparatus to maximize the voltage contrast by purposefully reducing the collection efficiency.

The examiner has provisionally rejected claims 1-5 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending Applications No. 10011618 and 10024777. Upon indication the application is otherwise allowable, the applicants will provide a terminal disclaimer.

It is respectfully believed that claims 1-10 are therefore allowable.

In light of the above noted amendments and remarks, this application is believed in condition for allowance and notice thereof is respectfully solicited. The Examiner is asked to contact applicants' attorney at 512-328-9510 if there are any questions.

Respectfully submitted,

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